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| 09/822,944 | 03/30/2001 | Harry Q. Pon | 42390P10075 | 6606 |

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| EXAMINER | |
|---|---|
| ANDUJAR, LEONARDO | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2826 | 13 |

DATE MAILED: 03/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/822,944 | Applicant(s) PON, HARRY Q. | |
|---|---|---|---|
| | Examiner Leonardo Andújar | Art Unit 2826 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3,5-10,12 and 14-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-10,12 and 14-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
4) ☐ Interview Summary (PTO-413) Paper No(s) _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/10/2002 has been entered.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U S C 122(b) Therefore this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1, 3, 6, 7 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by KOGYO (cited by Applicant).

5. Regarding claim 1, KOGYO (see attachment) shows an apparatus comprising:

- A bonding wire having a first end connected to a bonding pad;
- And an insulating material coating the bond wire having a thickness of 0.4 micrometers (see standard type table and drawings).

6. Regarding claim 3, KOGYO shows that the insulating material comprises polyvinyl.

7. Regarding claim 6, KOGYO shows a bond pad connect to an integrated circuit (fist side picture).

8. Regarding claim 7, KOGYO shows a bond pad connect to substrate.

9. Regarding claim 15, KOGYO (see attachment) shows an integrated circuit assembly comprising:

- An integrated circuit:
- A bond wire connected to the integrated circuit and the substrate;
- And a polymer insulating material coating the bond wire having a thickness of 0.4 micrometers.

10. Claim 12 is rejected under 35 U.S.C. 102(e) as being anticipated by Horiuchi et al. (US 6,084,295).

11. Regarding claim 12, Horiuchi (e.g. figs. 1-3) shows an integrated circuit assembly comprising:

- An integrated circuit 10;
- A substrate 5;
- A bond wire 20 connected to the integrated circuit and the substrate;

- And a polymer insulating material 30 coating the wire bond.

12. Horiuchi shows that the substrate 5 is a printed circuit board (co. 3/ll. 32).

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 1-3, 5-7, 15, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi et al. (US 6,084,295) in view of KOGYO (cited by Applicant).

15. Regarding claim 1, Horiuchi (e.g. figs. 1-3) shows an apparatus comprising:

- A bond wire 20;
- An insulating material 30 coating the wire bond;
- And a first end of the wire bond connected to a bond pad.

16. Horiuchi does not disclose that the thickness of the insulating material is in the range of approximately 0.2 micrometers to 0.6 micrometers. KOGYO shows a bond wire including an insulating coating having a thickness of 0.4 micrometers. Also, KOGYO teaches that this type of wires are desirable in order to achieve a fine pitch bonding, not short circuits causing by touching wires, long loop wire bonding, cross bonding and standardization of lead frames. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a bond wire including an insulating coating having a thickness of 0.4 micrometers in order to achieve a fine

pitch bonding, not short circuits causing by touching wires, long loop wire bonding, cross bonding and standardization of lead frames as taught by KOGYO.

17. Regarding claim 2, Horiuchi discloses that the bond wire is made of gold (col. 4/lls. 26-37).

18. Regarding claim 3, Horiuchi discloses that the insulating material comprises a polymer (col. 4/lls. 26-37).

19. Applicant's claims 5, does not distinguish over the Horiuchi in view of KOGYO reference regardless of the process used to connect the wire bond to the bond pad, because only the final product is relevant, not the process of making such ultrasonic bonding. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in " product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e). In the instant case, a semiconductor device where the wire bond is connected to the bond pad by ultrasonic bonding has the same functionalities and/or capabilities of a device where wire bond is connected to the bond pad by an alternative method.

20. Regarding claim 6, Horiuchi shows that the bond pad is connected to an integrated circuit (abstract).

21. Regarding claim 7, Horiuchi shows that the bond pad is connected to a substrate (e.g. fig. 1).

22. Regarding 15, Horiuchi (e.g. figs. 1-3) shows an integrated circuit assembly comprising:

- An integrated circuit 10;
- A substrate 5;
- A bond wire 20 connected to the integrated circuit and the substrate;
- And an insulating material 30 coating the wire bond.

23. Horiuchi does not disclose that the thickness of the insulating material is in the range of approximately 0.2 micrometers to 0.6 micrometers. KOGYO shows a bond wire including an insulating coating having a thickness of 0.4 micrometers. Also, KOGYO teaches that this type of wires are desirable to achieve a fine pitch bonding, not short circuits causing by touching wires, long loop wire bonding, cross bonding and standardization of lead frames. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a bond wire including an insulating coating having a thickness of 0.4 micrometers in order to achieve a fine pitch bonding, not short circuits causing by touching wires, long loop wire bonding, cross bonding and standardization of lead frames as taught by KOGYO.

24. Regarding claim 16 Horiuchi shows that the substrate 5 is a printed circuit board (co. 3/ll. 32).

25. Regarding claim 18, Horiuchi discloses that the bond wire is made of gold (col. 4/lls. 26-37).

26. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi et al. (US 6,084,295).

27. Regarding claim 8, Horiuchi (e.g. figs. 1-3) shows an apparatus comprising:

- A first bond wire 20;
- An insulating material (30 and 32) coating the wire bond;
- A first end of the wire bond connected to a bond pad;
- And a second bond wire crossing the first bond wire.

28. In the instant case the insulating resin 32 coats the first end of the wire bond whereas the remainder area is coated by the epoxy 30. Applicant's claims 8, does not distinguish over the Horiuchi reference regardless of the process used to connect the wire bond to the bond pad, because only the final product is relevant, not the process of making such as "*connecting the first end to the bond pad by ultrasonic bonding without previously removing the insulating from the first end*". Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new

method is not patentable as a product, whether claimed in " product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

29. Regarding claim 9, Horiuchi shows that the wires comprises an insulating material coating the second wire bond (e.g. fig. 3).

30. Regarding claim 10, Horiuchi shows that the first bond wire touches the second bond wire (e.g. fig. 1).

31. Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi et al. (US 6,084,295) in view of Uno (JP 11067812).

32. Regarding claim 14, Horiuchi (e.g. figs. 1-3) shows an integrated circuit assembly comprising:

- An integrated circuit 10;
- A substrate 5;
- A bond wire 20 connected to the integrated circuit and the substrate;
- And a polymer insulating material 30 coating the wire bond.

33. Horiuchi does not discloses that bond wire material comprises silver. Uno teaches a gold and silver thin wire for semiconductor device. Uno teaches that this type of wire is desirable because of its high junction reliability and low cost (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the bond wire disclosed by Horiuchi form a material comprising silver in order to obtain a low cost wire having a high junction reliability as taught by Uno.

34. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi et al. (US 6,084,295) in view of KOGYO (cited by Applicant) further in view of Takiar (US 5,422,435)

35. Horiuchi in view of KOGYO shows most aspects of the instant invention. Horiuchi in view of KOGYO does not disclose a second integrated circuit. Takiar (e.g. fig. 5) shows a package comprising a first integrated circuit connected to a second integrated circuit by bond wires. Takiar discloses that this type of embodiment provides a single circuit assembly. Furthermore, Takiar discloses that this type of arrangement is used to decrease the size and weight of the device, as well as to improve its performance (col. 2/lls. 3-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second integrated circuit in Horiuchi in view of KOGYO's invention in order to provide a single circuit assembly having a decreased size and weight as suggested by Takiar.

36. Claims 2 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over KOGYO (cited by Applicant) in view of Harper.

37. Regarding claims 2 and 16, KOGYO discloses most aspects of the instant invention. KOGYO does not disclose the material of the bond wire. Nonetheless, it is conventional in the art that bond wires are made from gold, silver, aluminum and copper. Harper discloses that wires are usually made of gold or aluminum (page 6.62). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the bond wires of KOGYO from gold or silver as it is conventional in the art as suggested by Harper.

38. Claims 5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over KOGYO (cited by Applicant).

39. Applicant's claims 5 and 8, does not distinguish over the KOGYO reference regardless of the process used to connect the wire bond to the bond pad, because only the final product is relevant, not the process of making such ultrasonic bonding. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in " product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e). In the instant case, a semiconductor device where the wire bond is connected to the bond pad by ultrasonic bonding has the same functionalities and/or capabilities of a device where wire bond is connected to the bond pad by an alternative method.

40. Regarding claim 8, KOYGO (see attachment) shows an apparatus comprising:

- A first bond wire;
- An insulating material coating the wire bond;
- A first end of the wire bond connected to a bond pad;

- And a second bond wire crossing the first bond wire.

41. Applicant's claims 8, does not distinguish over the KOYGO reference regardless of the process used to connect the wire bond to the bond pad, because only the final product is relevant, not the process of making such as "*connecting the first end to the bond pad by ultrasonic bonding without previously removing the insulating from the first end*". Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in " product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e). In the instant case, a semiconductor device where the wire bond is connected to the bond pad by connecting the first end to the bond pad by ultrasonic bonding without previously removing the insulating from the first end has the same functionalities and/or capabilities of a device where wire bond is connected to the bond pad by an alternative method.

42. Regarding claim 9, KOGYO shows an insulating material coating the second bond wire.

43. Regarding claim 10, KOGYO shows that the first bond wire touches the second bond wire.

44. Claims 12 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over KOGYO (cited by Applicant) in view of Herbert (US 5,798,667)

45. Regarding claims 12 and 16, KOGYO (see attachment) shows an integrated circuit assembly comprising:

- An integrated circuit;
- A substrate;
- A bond wire connected to the integrated circuit and the substrate;
- And a polymer insulating material coating the wire bond.

46. KOGYO shows that the substrate is a lead frame. KOGYO does not disclose that the lead frame can be made of aluminum. Herbert discloses that power dissipation and cost in electrical systems can be reduced by using aluminum lead frames (col. 2/lls. 5-21). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the lead frame disclosed by KOGYO from aluminum in order to reduce the power dissipation and cost as taught by Herbert.

47. Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over KOGYO (cited by Applicant) in view of Uno (JP 11067812).

48. Regarding claims 14 and 18, KOGYO (see attachment) shows an integrated circuit assembly comprising:

- An integrated circuit;
- A substrate;

- A bond wire connected to the integrated circuit and the substrate;
- And a polymer insulating material coating the wire bond.

49. KOGYO does not discloses that bond wire material comprises silver. Uno teaches a gold and silver thin wire for semiconductor device. Uno teaches that this type of wire is desirable because of its high junction reliability and low cost (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the bond wire disclosed by KOGYO form a material comprising silver in order to obtain a low cost wire having a high junction reliability as taught by Uno.

50. Claims 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over KOGYO (cited by Applicant) in view of view of Takiar (US 5,422,435)

51. KOGYO shows most aspects of the instant invention. KOGYO does not disclose a second integrated circuit. Takiar (e.g. fig. 5) shows a package comprising a first integrated circuit connected to a second integrated circuit by bond wires. Takiar discloses that this type of embodiment provides a single circuit assembly. Furthermore, Takiar discloses that this type of arrangement is used to decrease the size and weight of the device, as well as to improve its performance (col. 2/lls. 3-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second integrated circuit in KOGYO's invention in order to provide a single circuit assembly having a decreased size and weight as suggested by Takiar.

***Response to Arguments***

52. Applicant's arguments, see paper no. 10, filed 01/10/2003, with respect to the rejection(s)of claim(s) 1-3, 5-10 and 15-18 under 35 USC 103(a) as being unpatentable

over Horiuchi have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

53. Applicant argues that Horiuchi does not suggest two bond wires crossing each other. Nonetheless, Horiuchi figure 1 clearly shows this limitation since all wires share a common intersection point. Note that the term "cross" can be interpreted as intersection (see the attached definitions).

***Conclusion***

54. Papers related to this application may be submitted directly to Art Unit 2826 by facsimile transmission. Papers should be faxed to Art Unit 2826 via the Art Unit 2826 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2826 Fax Center number is **(703) 308-7722** or **–7724**. The Art Unit 2826 Fax Center is to be used only for papers related to Art Unit 2826 applications.

55. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Leonardo Andújar** at **(703) 308-0080** and between the hours of 9:00 AM to 7:30 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Leonardo.Andujar@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on (703) 308-6601

56. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 305-3900.**

57. The following list is the Examiner's field of search for the present Office Action:

| Field of Search | Date |
|---|---|
| U.S. Class / Subclass (es): 257/723, 782 and 786 | 02/03 |
| Other Documentation: | |
| Electronic Database(s): East (USPAT, US PGPUB, JPO, EPO, Derwent, IBM TDB) | 02/03 |

***Leonardo Andújar***
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3/1/03